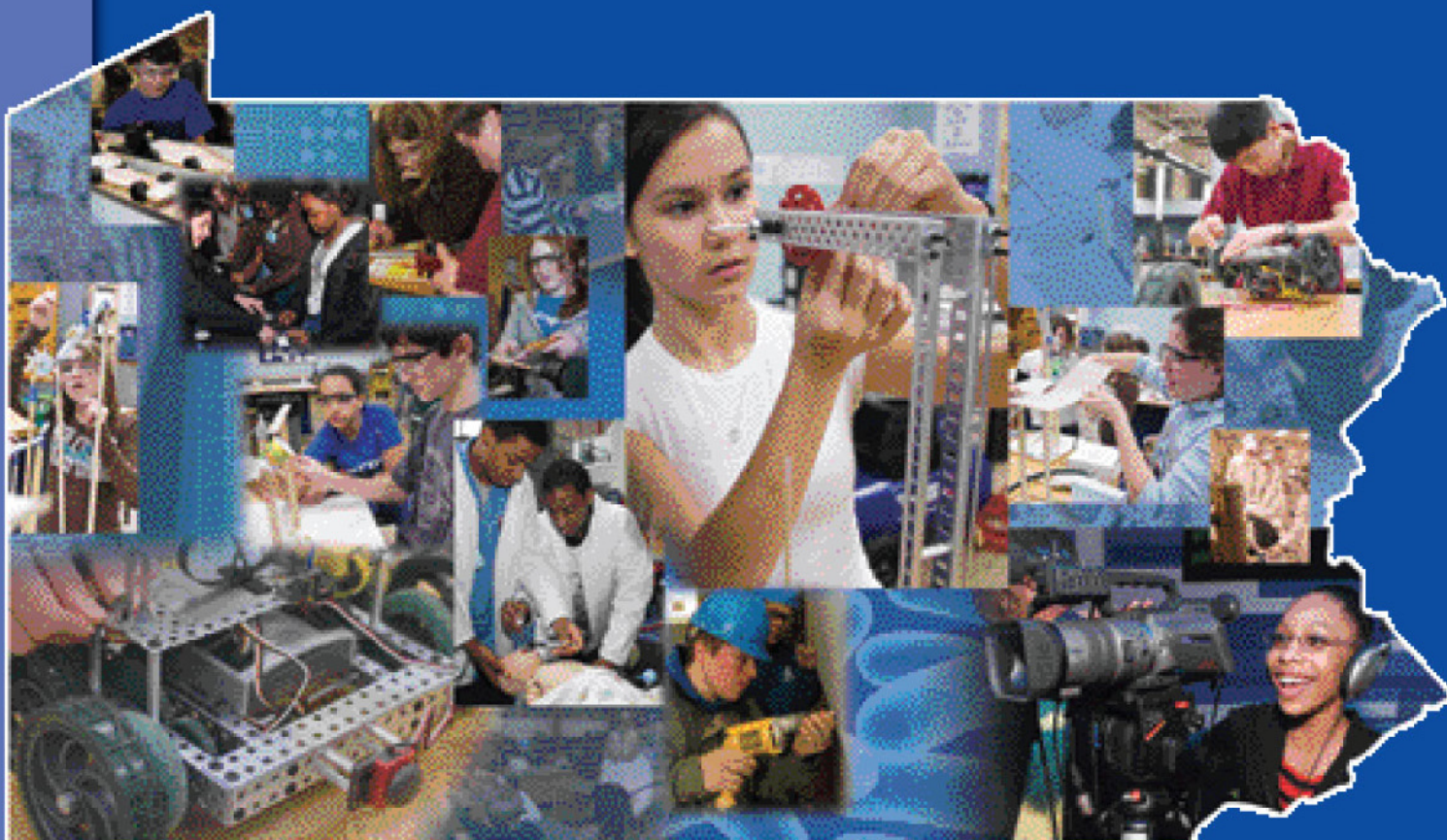


A Middle School Educator's Guide to Career Pathways



- *Best practices in the Keystone State*
- *Connecting curriculum and clusters*
- *Picking the right pathways*

Dear Fellow Educator,

In Pennsylvania, our career education program starts as early as kindergarten and expands until high school graduation. This is because we know how crucial it is for our students to begin recognizing and exploring career and education options at an early age to make sure they can reach their full potential in life.

All career education programs focus on transferable skills that apply academic course content in relevant, meaningful ways. Middle school programs, however, are particularly important because students in them are more motivated to learn and have a clearer understanding of high school career options.

In 2006, Pennsylvania launched new academic standards for career education and work. Under these standards:

- Students, by eighth grade, are beginning their individualized career plan and portfolios, which will be developed throughout high school, and are learning job-interview skills.
- Curricula are integrated and crosswalked to meet grade-level benchmarks.
- Technology education gets a special middle school emphasis.
- Schools have clear language and guidance to fully prepare students for the workplace.
- Representatives from schools, business and industry, and community agencies receive ongoing training in how to implement the standards.

In school systems throughout the commonwealth, innovative educators and administrators are using new systems of career pathway education to meet these standards. Career pathways give education a new focus—not just on preparing students for success in the next grade or even for success in college, but for success in careers and in life. Career pathways revitalize education by showing students the connection between what they learn in school today and their futures in the world of work.

Under Governor Edward Rendell's leadership, the Commonwealth has not only placed a strong focus on the importance of career education, but also made unprecedented investments in science- and technology-related initiatives that will help put Pennsylvania students at the forefront of many high-priority industries. Initiatives such as "Science: It's Elementary" and "Classrooms for the Future" are meant to give more students exposure to the science and technology that have become commonplace in our knowledge-based economy. Besides delivering a stronger science, technology, engineering, and math (STEM) curriculum, they provide hands-on work that is engaging and fun for students.

Middle school is, above all, a time of exploration. I hope you will use *Pennsylvania Pathways* as your guide to possibilities in teaching and learning about careers in grades six through eight. As you read, please consider how you might implement the components of career pathways in your own school or district. It is seldom feasible to turn schools around overnight, but as recent years have shown us, implementing even single elements of a pathways system can make a difference. As we continue the adventure of improving our schools, I thank you for your contributions to this important effort and wish you all the best.

Sincerely yours,



Gerald L. Zahorchak
Secretary of Education
Commonwealth of Pennsylvania



pennsylvania
DEPARTMENT OF EDUCATION

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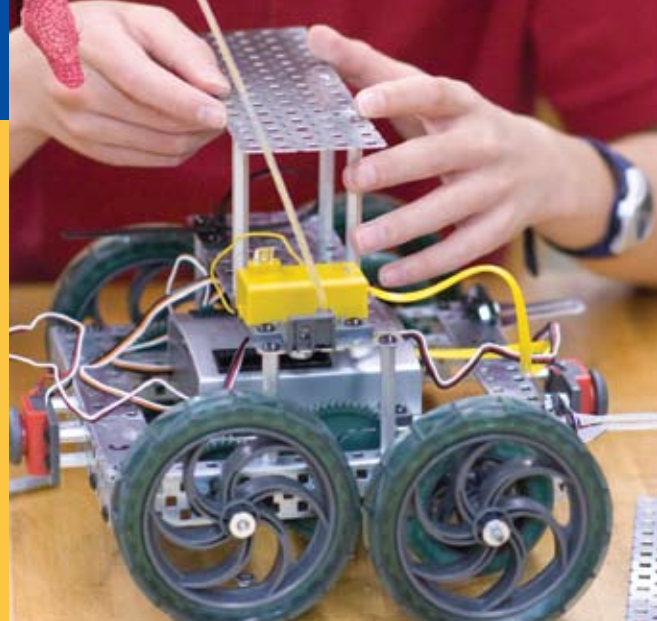
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Career Pathways Lead Pennsylvania Middle School Students to Success

Pennsylvania Pathways: An Educators' Guide to Career Pathways was published in 2006 to assist high school-level teachers and counselors with the implementation of the pathways system. The booklet you are reading extends information about Pennsylvania's career pathways to middle schools.

In the pages that follow, you will meet students, teachers, families, and communities throughout the state and see how career pathways work in middle schools, why they are necessary, and how they are creating education success stories across the commonwealth.

Pennsylvania has implemented career pathways to help students, schools, and the economy succeed. Career pathways are a way of organizing learning around clusters of study that represent the largest sectors of the Pennsylvania job market.

The federal Carl D. Perkins Career and Technical Education Improvement Act of 2006 mandates that such career pathways provide rigorous academic and technical content with seamless transitions from middle school and high school to higher education and careers.

The Commonwealth has recognized the strength of such a system and has adopted the 16 federal career clusters (*see page 4*), but individual school systems can adapt their own clusters from these. The state has also designated 11 high priority occupational sectors (*see page 6*), which align with the clusters and can help students make informed decisions about their future. Academic standards for career education and work have been established in the state to assist school districts as they develop strategies to ensure that students acquire age-appropriate skills and knowledge throughout their schooling.

In addition, as part of Governor Ed Rendell's reform initiatives for Pennsylvania schools, the role of school counselor has been transformed to ensure that every student, beginning in middle school, receives the career planning assistance he or she needs to be successful in school and beyond.

Now, through a variety of career pathways initiatives offered in Pennsylvania middle schools, students in grades six through eight can follow their career interests, explore their career options, close academic gaps, and benefit from job shadowing and mentor programs. In particular, students, teachers, and counselors are encouraged to consider the career advantages of Pennsylvania's high priority occupations, based on the most recent available labor market data.

Career Education and Work Standards

What Pennsylvania students should know and be able to do.

	Grade 3	Grade 5
Career Awareness and Preparation Getting Ready for Work	<ul style="list-style-type: none"> ■ Recognize that individuals have unique interests. ■ Identify current personal interests. ■ Recognize that the roles of individuals are constantly changing. ■ Identify the range of jobs available in the community. ■ Describe the work done by school personnel and others in the community. ■ Explore how people prepare for careers. ■ Explain why education and training plans are important. ■ Explain how workers in their careers use what is learned in the classroom. 	<ul style="list-style-type: none"> ■ Describe the impact of individual interests and abilities on career choices. ■ Describe the impact of personal interests and abilities on career choices. ■ Relate the impact of change to traditional and nontraditional careers. ■ Describe the range of career training programs in the community. ■ Describe the factors that influence career choices. ■ Investigate people's rationale for choosing careers. ■ Identify the components of a career plan. ■ Connect personal interests, abilities, and academic strengths to personal career options.
Career Acquisition Getting Jobs	<ul style="list-style-type: none"> ■ Identify appropriate speaking and listening techniques used in conversation. ■ Discuss resources in researching job opportunities. ■ Compose a personal letter. ■ Identify the importance of developing a plan for the future. ■ Discuss the importance of essential workplace skills. 	<ul style="list-style-type: none"> ■ Apply appropriate speaking and listening techniques. ■ Identify and review resources available in researching job opportunities. ■ Compose and compare a business and a personal letter. ■ Identify individualized career portfolio components. ■ Apply essential workplace skills to daily activities (e.g., commitment, communications, dependability, team building).
Career Retention and Advancement Maintaining and Improving Careers	<ul style="list-style-type: none"> ■ Identify attitudes and work habits that contribute to success both at home and school. ■ Identify how to cooperate both at home and school. ■ Explain effective group interaction terms. ■ Explain how money is used. ■ Discuss how time is used both at home and school. ■ Identify the changes that occur in family and friends' roles at home, at school, and in the community. ■ Define and describe the importance of lifelong learning. 	<ul style="list-style-type: none"> ■ Explain how student attitudes and work habits transfer from the home and school to the workplace. ■ Explain the importance of working cooperatively with others to complete a task. ■ Identify effective group interaction strategies. ■ Explain budgeting. ■ Develop a personal schedule based on activities and responsibilities at home and school. ■ Describe the impact of role changes at home, school, and at work, and how the role changes affect career advancement and retention. ■ Describe how personal interests and abilities have an impact on lifelong learning.
Entrepreneurship Starting and Running Businesses	<ul style="list-style-type: none"> ■ Define entrepreneurship. ■ Discuss the character traits of successful entrepreneurs. ■ Discuss entrepreneurial opportunities. 	<ul style="list-style-type: none"> ■ Identify the risks and rewards of entrepreneurship. ■ Discuss the character traits of entrepreneurs past and present. ■ Discuss the steps taken to bring goods and services to market.

About this chart

To help school districts across the state establish career pathway systems, Pennsylvania has approved academic standards for career education and work. These standards guide curriculum planners by laying out the knowledge and skills students need to achieve career success. The standards are grouped into four assessment areas, all of which will be revisited throughout a lifetime as students of all ages maintain and practice their career skills. Districts can implement strategies within existing disciplines or can implement stand-alone courses to specifically address these standards.

Grade 8	Grade 11
<ul style="list-style-type: none"> ■ Relate careers to individual interests, abilities, and aptitudes. ■ Relate careers to personal interests, abilities, and aptitudes. ■ Explain how traditional and nontraditional careers offer or hinder career opportunities. ■ Explain the relationship of career training programs to employment opportunities. ■ Analyze the economic factors that have an impact on employment opportunities. ■ Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation. ■ Create an individual career plan including career portfolio, career goals, cluster/pathways opportunities, individual interests and abilities, and training/education requirements. ■ Choose personal electives and extracurricular activities. 	<ul style="list-style-type: none"> ■ Relate careers to individual interests, abilities, and aptitudes. ■ Analyze career options based on personal interests, abilities, aptitudes, achievements, and goals. ■ Analyze how the changing roles of individuals in the workplace relate to new opportunities within career choices. ■ Evaluate school-based opportunities for career awareness/preparation. ■ Justify the selection of a career. ■ Analyze the relationship between career choices and career preparation opportunities. ■ Assess the implementation of the individualized career plan. ■ Review personal high school plan in light of current personal career goals and select postsecondary opportunities based upon personal career interests.
<ul style="list-style-type: none"> ■ Identify effective speaking and listening skills used in a job interview. ■ Evaluate resources available in researching job opportunities. ■ Prepare a draft of career acquisition documents. ■ Develop an individualized career portfolio. ■ Explain the importance of the essential workplace skills/knowledge to the career acquisition process. 	<ul style="list-style-type: none"> ■ Apply effective speaking and listening skills used in a job interview. ■ Apply research skills in searching for a job. ■ Develop and assemble, for career portfolio placement, career acquisition documents. ■ Analyze, revise, and apply an individualized career portfolio to chosen career path. ■ Demonstrate the application of essential workplace skills/knowledge in the career acquisition process.
<ul style="list-style-type: none"> ■ Determine attitudes and work habits that support career retention and advancement. ■ Analyze the role of each participant's contribution in a team setting. ■ Explain and demonstrate conflict resolution skills. ■ Analyze budgets and pay statements. ■ Identify and apply time management strategies as they relate to personal and work situations. ■ Identify characteristics of the changing workplace and explain their impact on jobs and employment. ■ Identify lifelong learning opportunities that support career retention and advancement. 	<ul style="list-style-type: none"> ■ Evaluate personal attitudes and work habits that support career retention and advancement. ■ Evaluate team member roles to describe and illustrate active listening techniques. ■ Evaluate conflict resolution skills as they relate to the workplace. ■ Develop a personal budget based on a career choice. ■ Evaluate time management strategies and their application to personal and work situations. ■ Evaluate strategies for career retention and advancement in response to the changing global workplace. ■ Evaluate the impact of lifelong learning on career retention and advancement.
<ul style="list-style-type: none"> ■ Compare and contrast entrepreneurship to traditional employment. ■ Evaluate how entrepreneurial character traits influence career opportunities. ■ Identify and describe the basic components of a business plan. 	<ul style="list-style-type: none"> ■ Analyze entrepreneurship as it relates to personal career goals and corporate opportunities. ■ Analyze entrepreneurship as it relates to personal character traits. ■ Develop a business plan for an entrepreneurial concept.

*Assessment points listed on this chart were abbreviated for space reasons. To view the original document, visit www.pde.state.pa.us/stateboard_ed/lib/stateboard_ed/FinalFormCareerEdWorkStds.pdf.

Career Clusters

The U.S. Department of Education has designated 16 clusters of careers that form the basis for Career Pathway systems in Pennsylvania. Each cluster represents a group of related industries and occupations in the American economy.

In a Career Pathways system, students choose a pathway that will prepare them for employment in the cluster that best fits their interests and abilities. Pennsylvania schools can and do set up systems that organize clusters differently or use alternate names, depending on local needs and resources.

Here are the 16 national clusters, with descriptions and typical occupations listed for each cluster.



Processing, production, distribution, financing, and development of agricultural commodities and natural resources

Possible Occupations

- Farmer
- Pest Control Worker
- Forest and Conservation Technician
- Veterinarian



Providing education and training services, and related learning support services

Possible Occupations

- Teacher Assistant
- Preschool, Middle School, and Secondary School Teacher
- Special Education Teacher
- Education Administrator



Managing restaurants and other food services, lodging, attractions, recreation events, and travel-related services

Possible Occupations

- Lodging Manager
- Baker
- Travel Agent
- Food Service Manager



Processing materials into intermediate or final products

Possible Occupations

- Machinist
- Welder, Cutter, Solderer, and Brazier
- Electrical and Electronic Engineering Technician
- Industrial Production Manager



Designing, managing, building, and maintaining the built environment

Possible Occupations

- Carpenter
- HVAC Mechanic and Installer
- Architectural Drafter
- Civil Engineer



Financial and investment planning, banking, insurance, and business financial management

Possible Occupations

- Teller
- Personal Finance Advisor
- Insurance Sales Agent
- Financial Manager



Providing for families and serving human needs

Possible Occupations

- Child, Family, and School Social Worker
- Rehabilitation Counselor
- Director, Child Care Facility
- Cosmetologist/Barber



Performing marketing activities to reach organizational objectives

Possible Occupations

- Telemarketer
- Real Estate Agent
- Wholesale and Retail Buyer
- Advertising and Promotions Manager



Creating, exhibiting, performing, and publishing multimedia content

Possible Occupations

- Video Systems Technician
- Printing Equipment Operator
- Graphic Designer
- Archivist, Curator, and Museum Technician



Executing governmental functions at the local, state, and federal levels

Possible Occupations

- Postal Service Mail Carrier
- Emergency Management Specialist
- Tax Examiner, Collector, and Revenue Agent
- Urban and Regional Planner



Designing, supporting, and managing hardware, software, multimedia, and systems integration

Possible Occupations

- Computer Support Specialist
- Network Systems Administrator
- Computer Programmer
- Applications Software Engineer



Performing scientific research and professional and technical services

Possible Occupations

- Surveying and Mapping Technician
- Avionics Technician
- Nuclear Engineer
- Mathematician



Organizing, directing, and evaluating functions essential to productive business operations

Possible Occupations

- Bookkeeping, Accounting, and Auditing Clerk
- Chief Executive Officer
- Public Relations Specialist
- Human Resources Manager



Providing diagnostic and therapeutic services, health informatics, support services, and biotechnology research and development

Possible Occupations

- Physician
- Registered Nurse
- Emergency Medical Technician and Paramedic
- Speech-Language Pathologist



Providing legal, public safety, protective, and homeland security services

Possible Occupations

- Private Detective and Investigator
- Probation Officer and Correctional Treatment Specialist
- Lawyer
- Judge



Managing movement of people, materials, and goods by road, pipeline, air, rail, and water

Possible Occupations

- Materials Handler
- Bus Driver
- Air Traffic Controller
- Automobile Service Technician

How to Answer Students' Questions

■ What's a career pathway?

A career pathway, like any other pathway, is a route you take that gets you to your destination—in this case, your career. Because there are so many different careers to choose from, Pennsylvania's pathways have been organized into groups called career clusters. In Pennsylvania, middle school students like you use career clusters and pathways to investigate a wide range of career options.

Clusters and pathways make it easier to understand why some courses in high school and college are required, rather than elective. They also help you choose your elective courses wisely.

■ Why do I need to think about this now?

The time is right to start thinking about your future. The earlier you start, the better the decisions you'll make. This is a chance to begin to explore and prepare for what you might do when you are grown up.

In elementary school, you learned that each of us has our own unique set of skills and interests. You were introduced to many careers. Now that you are in middle school, you'll have opportunities to explore careers as they relate to your skills and interests. This is a time to find out which careers you like and—equally important—which careers you don't like.

Middle school is also a time when you should talk with your parents, school counselors, teachers, and people in different careers. They can help you recognize your talents and abilities, and can show you how the things you're learning in school are important in careers. The earlier you understand the connections between what you're learning now and how to use it later, the better. Learning more about careers and building skills helps you have more choices later in your life. It also boosts your chances of doing well in high school and college and, most importantly, of choosing a career you'll love.

■ How do career pathways work?

Between sixth and eighth grade, you will participate in a variety of activities where you'll be exploring your interests. You'll learn about different jobs and the skills needed for them.

You'll be learning about the different career pathways and choosing one or two that are especially interesting to you. You'll work with your school counselors and teachers to begin your individual career plan. You'll create a career portfolio. In eighth grade, you will get a look at the courses available at your high school, and you'll have a chance to develop a plan for high school studies based on the pathways you've chosen.

Remember: your selections and interests do not "lock you in" to any one pathway, so explore as many options as possible.

■ Who decides my pathway?

Your career pathway is your decision. You're in charge. You're already the authority on who you are, what you like, and what interests you. Your parents, teachers, and school counselor, along with professionals from your community, can provide information about your choices. Your high school counselor can help you with the development of your career plan.

■ When do I have to make a decision?

Choosing a career pathway doesn't lock you in to any specific career—or career pathway, for that matter. You probably won't need to declare your choice of pathway until high school and even then, you will be able to change it with the help of your school counselor. A wise person said, "It's never too late to begin exploring a career, and it's never too late to change it."

■ Where can I go to find out more?

Your school counselor can help you find programs that allow you to start exploring careers. Your school counselor and teachers can also help you find websites and other resources offering tools designed for middle school students who want to know more about what their future may hold. Right now in Pennsylvania, students are exploring possible career pathways in all kinds of middle school programs: classes, after-school clubs, guidance sessions, and more.

Success in Susquehanna



Angela Cosner

Exploring engineering in eighth grade got Angela Cosner hooked on robotics. Now the Susquehanna County Career and Technology Center student, a senior at Elk Lake High School and a US FIRST Robotics team member, has her mind set on a Ph.D. in mechanical engineering.

Cosner believes FIRST Robotics competitions have boosted her confidence in her skills. "I have enjoyed the camaraderie and the idea that I can achieve great success in a non-traditional field. It has been a great feeling showing other females what engineering is about," Cosner said.

"It's amazing to see just how the academics go hand-in-hand with the technical skills that are required," she continued. She thinks that building the robot and competing with it has made her academics more meaningful.

Alice M. Davis, Susquehanna County Career & Technology Center Administrative Director, is very proud of Cosner and her accomplishments. According to Davis, "I am pleased to see how the students are utilizing both academic and technical skills."

Cosner has received college acceptance letters from Rochester Institute of Technology and Kettering, Drexel, Penn State, and Clarkson universities to further her engineering education.

Pennsylvania's High Priority Occupations

Pennsylvania is targeting workforce development in 11 groups of industries critical to the commonwealth's future.

Everyone wants our young people to succeed in the world of work, but not everyone realizes how important students' success is, not just for their own economic future, but for the future of the entire population of Pennsylvania.

For Pennsylvania to prosper, it must be able to compete—and not just with New York or Virginia, but with China, India, and Malaysia. To compete globally, Pennsylvania must have the skilled workers it needs to run the industries that matter most to its future, those that are best positioned for success in the global marketplace.

That's why the Commonwealth's Departments of Labor and Industry, Community and Economic Development, and Education have come together to identify the 11 sectors of "high priority" occupations in which Pennsylvania has the best competitive advantage and most potential for long-term growth. Pennsylvania's economy and workforce are constantly changing. In order to target the needs of its evolving workforce, particularly in the health care and energy sectors, the Department of Labor and Industry recently created three new sectors: Health Care, Bio-Medical, and Energy.

Career pathways are important for everyone in Pennsylvania. They offer students a way to build futures in the industries that are most likely to pay well, grow, result in job security, and keep our commonwealth economically strong. They offer students clearly defined strategies for getting the education and training they need to succeed in each of the critical industry clusters.

Pennsylvania's 11 targeted industry clusters are listed at right. Also listed are high priority occupations within each cluster together with a description of the cluster and its importance to the commonwealth. To learn more about Pennsylvania's high priority occupations, visit www.paworkforce.state.pa.us and click on "Careers in Demand/High Priority Occupations."



1 Advanced Materials and Diversified Manufacturing

The Advanced Materials and Diversified Manufacturing cluster includes most durable industries as well as the printing industry. Not included are food production, tobacco, lumber, paper, pharmaceuticals, and building materials. Technological advances have changed manufacturing in this country, with metals and plastics production becoming increasingly automated. Although these advances have decreased demand for manual labor, the demand for highly skilled workers has increased. Growth in the future depends on Pennsylvania's ability to train skilled workers.

Sample High Priority Occupations

- Welders
- CNC (Computer Numerical Control) Machinists
- Industrial Truck and Tractor Operators
- Molding and Casting Machine Operators

2 Agriculture and Food Production

The Agriculture and Food Production cluster begins with the growing of resources, such as grains and livestock, for food, and ends with the wholesale distribution of these products. Agriculture in Pennsylvania produces more than \$4 billion annually in cash receipts, and the commonwealth ranks second in the country in the dollar value of agricultural products sold for human consumption. Pennsylvania must explore the workforce needs of this cluster and support education and training accordingly.

Sample High Priority Occupations

- Shipping and Receiving Clerks
- Food Batchmakers
- Drivers/Sales Workers
- Sales Representatives

3 Bio-Medical

The Bio-Medical cluster includes industries that are involved in the development and use of technology to enhance life, such as research laboratories and pharmaceutical manufacturers. Postsecondary research and development programs and pharmaceutical companies are prevalent throughout the state and make Pennsylvania a perfect incubator for growth in many bio-medical fields. To enable this growth, this cluster requires a highly educated and creative workforce.

Sample High Priority Occupations

- Sales Representatives
- Medical and Clinical Laboratory Technicians
- Biological Technicians
- General Managers

4 Building and Construction

The Building and Construction cluster includes industries directly involved in the construction of housing, roadways, or other physical structures. The construction industries are an integral part of a region's ability to prosper. The increasing demand for construction services requires highly skilled craftspeople and other skilled workers. Pennsylvania must address the needs of the various construction trades, many of which rely on career and technical training and apprenticeships.

Sample High Priority Occupations

- Plumbers, Pipefitters, and Steamfitters
- Heating, Air Conditioning, and Refrigeration Mechanics and Installers
- Construction Managers
- Brickmasons and Blockmasons

Business and Financial Services

The Business and Financial Services cluster includes banking and credit institutions, insurance carriers and brokers, personal and professional business services, advertising and marketing agencies, and an assortment of business support services. These support industries provide numerous entrepreneurial opportunities to a young, motivated, and educated workforce. Workforce development strategies target this cluster to ensure a solid business foundation in the state.

Sample High Priority Occupations

- Sales Managers
- Management Analysts
- Securities, Commodities, and Financial Services Sales Agents
- Paralegals and Legal Assistants

Education

The Education cluster encompasses elementary schools through universities, as well as technical schools and junior colleges. Support services such as school bus transportation and day care are included in the cluster, as are public agencies that oversee educational programs. Shortages exist in a number of key teaching positions. The need for well-trained, highly qualified teachers is increasing across the country.

Sample High Priority Occupations

- Elementary and Secondary School Administrators
- Engineering Teachers
- Career and Technical Education Teachers
- Educational, Career and Technical, and School Counselors

“Pennsylvania’s economy and workforce is constantly changing.”

—Kimberly DeLellis
Workforce Development Manager
Pennsylvania Department of Labor & Industry

Energy

The Energy cluster includes many traditional industries, as well as emerging “green” industries. Examples include coal mining, natural gas distribution, hydroelectric power generation, storage battery manufacturing, and utility regulation. Jobs offer relatively high wages and have good job security; energy supply is not likely to surpass demand in the near future, and the jobs cannot be shipped overseas. A strong workforce is needed to ensure that Pennsylvania is energy efficient in the future.

Sample High Priority Occupations

- Welders
- Construction and Extraction Supervisors
- Operating Engineers
- Production Supervisors

Health Care

Direct patient care and related support services form the cornerstone of the Health Care cluster. The ability of the commonwealth to provide a full range of health care services to its population is critical. Investments in worker education and training are necessary for the overall economic success of the health care system.

Sample High Priority Occupations

- Family and General Practitioners
- Physicians’ Assistants
- Medical Laboratory Technicians
- Pharmacists
- Registered Nurses

Information and Communication Services

The Information and Communication Services cluster includes businesses engaged in the production and dissemination of information, such as newspapers and motion pictures. Also included are information support industries such as computer systems design and Internet service providers. There is a growing need in Pennsylvania for technical design and consulting services. Workers in this field are among the highest paid in Pennsylvania’s high priority occupations.

Sample High Priority Occupations

- Computer Software Engineers, Systems Software
- Computer Systems Analysts
- Advertising Sales Agents
- Network and Computer Systems Administrators

Logistics and Transportation

The Logistics and Transportation industry cluster includes industries that are related to the storage, transportation, and distribution of goods. Pennsylvania is the transportation corridor for the Northeast. Our ports, rail systems, and highways make us highly competitive in the warehousing and shipment of goods. As these services increasingly become mechanized, a qualified workforce becomes vital to future development efforts.

Sample High Priority Occupations

- Supervisors, Transportation and Vehicle Operators
- Bus, Truck, and Diesel Engine Mechanics
- Heavy and Tractor-Trailer Truck Drivers
- Industrial Truck and Tractor Operators

Lumber, Wood, and Paper

The Lumber, Wood, and Paper cluster includes logging companies, sawmills, wood furniture manufacturers and building material wholesalers. Pennsylvania is the number two exporter of hardwoods in North America. Forestry firms are experiencing workforce shortages, and increased use of technology may create demand for new workforce skill sets. Education and workforce development are needed to meet these demands.

Sample High Priority Occupations

- Cabinetmakers and Bench Carpenters
- Printing Machine Operators
- General Maintenance Workers
- Carpenters



The Lancaster Model

As a vibrant community partnership embeds career education in Lancaster County, middle schoolers reap the benefits.



Collaborating for Student Success

One of the critical components of career pathways reform is engaging the entire school community in effective career development. The school counselor, with his or her unique training in career development, is perfectly positioned to lead the collaborative efforts to engage the school community in helping middle school students explore and prepare for their pathways.

Career development in middle school is offered through a variety of strategies in varied settings. It can be integrated into content areas, offered through career guidance classes, studied in a specific career education course, or provided through individual or small group guidance, along with many other options. Some school districts have created career advisors or pathways coordinators to help the often overburdened school counselor.

Jacqueline Spittal is pathways coordinator for the Elizabethtown Area School District in Lancaster County. She says counseling experience is great preparation for her job. Noting that Lancaster County was ready for full-scale pathways reform, she says that what enabled the Elizabethtown district to lead the charge was the employment of a full-time pathways coordinator.

Counselors in pathways systems can find themselves in new and rewarding positions of leadership and coordination. They play a central role in students' career decisions. "The counselors are really excited about this," says Kim Patrick, Lancaster County Career and Technology Center's special projects coordinator. "It takes them out of just an administrative function and puts them in a leadership one."

Jennifer Jesberger, who coordinates middle school counseling for the Lancaster City School District, says she feels middle school students are still not getting enough information to choose wisely. She advocates for involving classroom teachers in career instruction. "As much as we have in place," she says, "the overall academic curriculum does not allow us to be in the classrooms as we need to be. What I would want is permission to infuse career instruction more into everyday teaching."



"I can tell you," says Beth Ann Haas, director of curriculum at Lancaster County Career and Technology Center (LCCTC), "this has been the best year I've ever had in education."

In Lancaster County, the Career and Technology Center, public school districts, workforce investment board, intermediate unit, and local businesses have all come together to craft a detailed template for embedding career education in schools countywide, and Haas is a happy woman. "I can tell you," she repeats, "I am having a ball."

■ A Call for Action

Haas says LCCTC, under the leadership of executive director Michael Curley, is working together with a broad community partnership for change. A call for change came from below and was not only heard by the powers that be, but taken up enthusiastically. Now all 16 school superintendents in the county have signed a memorandum endorsing career education programs of study that can be used by eighth

graders to plot their education and adapted to fit the needs of every district in the county.

When the Elizabethtown Area School District set these events in motion, says the district's pathways coordinator, Jacqueline Spittal, all it was looking for was a tool to help middle school counselors cope with the needs of eighth-grade students deciding which pathways to follow in high school. In some districts, counselors' burdens are overwhelming; ratios of one counselor to 600 students are common, and pathway responsibilities are great.

"Eighth-grade counselors do more with pathways than counselors in high school at this point," Spittal says. "Once we get students into their electives, then they're specializing, but it's feeding those students into the right elective courses in high school that's difficult."

■ Picking Opportunities

What Spittal wanted to do was help students pick pathways and courses according to their interests and talents, which is very important, but also on the basis of opportunities for employment in the local economy.

“Elizabethtown made the call,” says LCCTC’s Haas. “They knew I was the curriculum person here, and they said, ‘Hey, we want to start working on career pathways, how should we get started?’ My first thought was, ‘We need to get the Workforce Investment Board involved.’”

■ Bringing in the WIB

The Lancaster County Workforce Investment Board (WIB) tracks economic trends to help business and industry meet their workforce needs, and takes a particular interest in career education in the county’s schools. They were very interested in helping Elizabethtown, says WIB Youth Coordinator Andrew Garner.

“We provided Elizabethtown information on educational attainment, average wages, and percentage change in job growth,” says Garner. Elizabethtown listed the information in tables compiled in its Pathways Planner for each of 280 occupations, enabling students to make instant and accurate judgments on how much education a particular career requires, how much income it offers, and whether it promises a stable future (*see Programs of Study on page 16*).

■ Cut and Dried

Spittal says the benefits of the WIB data are immediately apparent to students. “The salaries are relevant to our area,” she says, “plus, students can compare; they can see the connection between the education levels and the salaries. It’s just cut-and-dried for them.”

Jobs in the planner are organized according to the district’s four broad pathways (Arts and Communication; Business and Finance; Engineering, Science, and Technology; and Health and Social Services), and the U.S. Department of Education’s 16 more specific career clusters. Elizabethtown’s recommended electives in each cluster are highlighted below the job listings, related electives are listed, and related programs at LCCTC are shaded in purple.

The Elizabethtown guide ties up career planning in a neat, efficient, user-friendly package. The WIB and LCCTC were so taken with the district’s work that they decided to make it the framework for the county’s career pathways model. “We’re really trying to organize ourselves as a county around career pathways,”

says the LCCTC’s Haas, “and specifically around the four career pathways listed.”

■ It’s Official

Now the job is to get the word out to eighth graders and their parents in the 16 county districts. “Things are actually happening very quickly,” Haas says. “We conducted workshops last summer around the new program of study. This really needs to be highlighted—every one of the 16 superintendents has signed on the dotted line a memorandum of understanding that this information in these books needs to be communicated to their eighth graders. This information is common now, and it’s actually in all 16 of their course catalogs.”

Kim Patrick, LCCTC’s special projects coordinator, says the changes are already benefiting her family. “My daughter is in Conestoga Valley Middle School,” says Patrick, “and she went for the course selection evening with my husband and they talked for 15 minutes about workforce needs. I don’t think that ever had happened before.”

Pinpointing Students’ Needs

Six hundred students in Lancaster County have individual Education plans (IEPs). These students’ special needs are often met with some form of career and technical education (CTE) training, usually at the Lancaster County Career and Technology Center (LCCTC).

The LCCTC course selection guide for students with IEPs includes a new tool that is enabling students and counselors to zero in on instructional needs and strategies with remarkable accuracy, and it’s all a matter of considering what a particular program requires in light of the student’s situation.

For each CTE program, the chart lists benchmarks down one side of the page—reading levels, math levels, tasks per week, and tests, among others.

The next column lists the requirements for the program; in the cabinetmaking and millwork program, for example, reading level requirements are 10th to 11th grade. In the column next to that, the counselor notes the student’s present education level in each category, and in the final column are actions needed to help the student meet the benchmarks set for the course.

The chart, called a “discrepancy chart,” allows counselors and students to evaluate a student’s preparation for a program and devise exact strategies to help the student achieve readiness. The IEP team, usually made up of 5–6 individuals, including agents and teachers, makes the decisions. Counselors are available to assist the team by providing information. If there is a discrepancy between what



the program requires and what the student has attained, counselors can help figure out what needs to be done to support the student’s success.

“If there are two or three discrepancies,” says Brenda Kauffman, supervisor of school-to-work transition in special education services for Lancaster–Lebanon Intermediate Unit 13, “we can usually find an accommodation. If there are five discrepancies, we might want to ask if this is the right program for the student.”

The chart works as a systematic reality check. “We always had the requirements, and we always had the student’s present education level, but we never put them side by side,” Kauffman says. “Putting them side by side just makes things so clear for people.”

Small Learning Communities Thrive

Throughout Pennsylvania, school districts are implementing career pathways in a variety of frameworks. Here are some of the best practices in middle schools from across the commonwealth.

Lancaster city schools have been pioneers in career pathways education. A recipient since 2001 of a career education grant from the Lancaster County Workforce Investment Board, the School District of Lancaster has used the funding to create the Future Planning Center, which supports seven different small learning communities (SLCs)—career-themed schools-within-a-school—at the McCaskey High School campus.

Four middle schools feed into the high school and its SLCs, and career education at the middle school level is directed at helping students choose the SLC that is right for them.

“In seventh and eighth grades,” says Jennifer Jesberger, coordinator of the district’s middle school counselors, “we do career lesson plans, interest inventories, and career awareness activities, discussing in depth possible small learning communities before they make those selections. Then the

Future Planning Center sets up a fair for us that is very valuable, where our students get to speak with students and teachers from the SLCs.” In January of their eighth grade year, students declare their final choice.

The Future Planning Center conducts the SLC Fair at Thaddeus Stevens College of Technology, which also has an extensive dual-enrollment agreement with the high school. “We figure it is a great opportunity to get eighth grade students on a college campus,” says Pam McCarty, the Future Planning Center director. The fair exposes students not only to the SLCs,

but to the role that college and dual enrollment can play in their future.

Kassey Jensen, an eighth grader at Lincoln Middle School, picked the Arts and Humanities SLC.

Kassey says, “What mostly helped me decide was the SLC Fair. We talked to the people in the SLCs and saw what they did. Like in Arts and Humanities SLC, they had photography, and in Media Studies SLC played a morning TV show they had taped.

“Every SLC showed exactly what they did every day and that really helped me make my decision, because I want to be a writer, and I saw there are so many things you can do there.”

Communication Is Key

In East Penn School District, Lehigh County, best practices in career education are shared through a network of point people in every school, says Linda Delvernois, the district’s supervisor of secondary education. “Communication is key when you’re implementing anything new,” Delvernois notes. Members of the district’s career education task force include point people from each of the schools. “At every school is a point person for career pathways,” Delvernois says, “so when we learn something new, we pass it along to our point people and they pass it along to their faculty.” Cindy Evans, workforce coordinator with the Lehigh Valley Workforce Investment Board, says a similar system operates at the county level. “They do best-practices sharing within the school districts,” she says, “so when East Penn does something great, Northern Lehigh School District can know about it.”

Mentors Make a Difference

Operating with a grant from Pennsylvania’s College and Career Counseling Program, Central Cambria School District in Ebensburg offers students the mutual benefits of mentor–mentee relationships. Central Cambria High School students are paired with Central Cambria Middle School students to provide them with guidance on careers and high school life. “I knew my mentee before we did this because we were in color guard together,” says high school junior Laurel Caurvina. “When she came up here and we visited the middle school, it was a lot better than just writing letters. We actually got to talk to one another.” Laurel’s mentee, eighth grader Mariah Dickert, also enjoys the experience. “It’s making me think a lot more about the career I would like to pursue,” Mariah says. As for Laurel, who once thought of becoming a pharmacist, she is now considering teaching. “I think this experience might have something to do with it,” she says.

Character Counts

Principal Erik Orndorff of Pequea Valley Intermediate School in Kinzers, Pennsylvania, believes character is an essential element of career education. “Soft” skills such as teamwork and character traits such as dependability and integrity clearly contribute to success in the workplace. That’s why Pequea Valley, in addition to seventh and eighth grade coursework modeled on the Career Education and Work Standards, stresses character development as part of career preparation. “Some of our lessons include conflict resolution skills,” says school counselor Kathy Jarrett, “and how team members contribute to team success.” Orndorff and his brother Bob, associate director of career development at Penn State, are coauthors of *Becoming the Best Me Instructor’s Manual: 10 Career and Character Education Essentials*.





South Park Tech

Students at South Park Middle School in western Pennsylvania have gone high tech. Using grant money from the National Science Foundation, the Society of Manufacturing Engineers, the Pennsylvania Department of Labor and Industry, and private business, the school has revamped technology education to promote the mastery of skills in STEM—science, technology, engineering, and math.

Rather than following cut-and-paste instructions, students in the revamped program work out their own solutions. Seventh graders take a design and modeling course and eighth graders take automation and robotics.

Student projects include computer-assisted design (CAD) of three-dimensional models, redesigning remote control cars to match particular specifications, and building working model elevators. In 2007, a team of South Park students used CAD to design and build their own balsa wood Formula 1 racer, which took first place in state competition and fourth place nationally. *(See Middle Schoolers Master STEM on page 14.)*

This Way to Downtown

The Pennsylvania Pathways program encourages off-campus learning activities. Now, Pennsylvania middle school students are following career pathways to Main Street and Elm Street.

A number of communities participating in the Department of Community and Economic Development's Main Street and Elm Street programs—part of the National Trust for Historic Preservation's nationwide revitalization effort—have engaged local school districts to help renew their downtown and adjacent older neighborhoods.

Middle school students are painting murals, tutoring, surveying, shadowing jobs, and doing internships. Students are also creating business plans for projects such as using empty storefronts as promotional space for the revitalization effort. The plans bring schools and communities together in win-win partnerships.

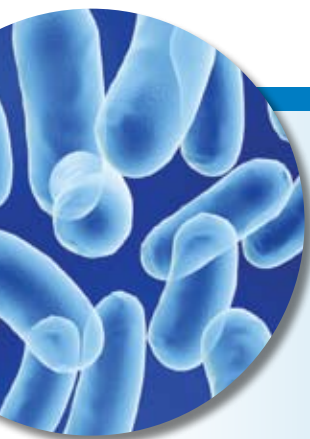
Reach Out to Parents

A career planning meeting for parents in the Penn Manor School District in January laid out workforce needs, described the importance of postsecondary training, and explained why a two-year degree path can be a better career choice than a four-year path. Counselors discussed personality assessments and online career education tools. According to Kim Patrick, special projects coordinator with Lancaster County Career and Technology Center, Penn Manor counselors “were a little nervous about it, because they weren’t sure how parents would react. But when the counselors talked about all the different career activities that they do, they got comments like, ‘Wow, we had no idea you were doing that much!’ So it was a really positive interaction between the counselors and the parents.”

The district is also collaborating with Dr. Sandra Deemer of Millersville University on a longitudinal study to gauge how graduates benefit from high school career exploration.

Involve Business Partners

The career pathways program at Middletown Area Middle School near Harrisburg includes close relationships with business people in the community that enrich career learning for the school's students. Students visit area businesses to learn about career opportunities in their own backyard and understand what it takes to succeed in the world of work. Leigh Philibosian of Mid-Atlantic Corporate Federal Credit Union and Scott Hile of Exel (a local logistics company) both have had daughters at the middle school, and both say their companies take community service seriously. “We have to get involved in the communities we’re doing business in,” says Hile. As for the students, they learn that large companies offer a variety of opportunities—observing electricians working at the corporate credit union, for example, and human resources personnel at the logistics warehouse. “The kids get to see I have a wide range of employees,” says Hile. “They can see there’s something here for them,” Philibosian agrees.



Transferable Skills

Manufacturing today operates in a technical environment that, for employees with the right skills, can offer broader opportunity than traditional manufacturing. Pennsylvania career educators say that's an important lesson for students at all levels.

For example, the nanofabrication program at Lehigh Career and Technical Institute is centered on microscopic techniques for the production of silicon chips, but skills such as using an electron microscope and managing a contaminant-free “clean room” transfer to a variety of other industries.

“Nanotechnology is used in a lot of products today and crosses over into chemistry, biology, and engineering,” points out John Sandrene, director of the Steel Center Area Vocational-Technical School.

Cindy Evans, workforce coordinator with the Lehigh Valley Workforce Investment Board, says that crossover multiplies opportunities for skilled workers. “Our kids’ generation needs to understand that today they can have skills that they can use in manufacturing in one place, but if they’re downsized they can take them elsewhere and be just as successful. That’s a transferable skill, and when a potential employer asks me why I’m appropriate for a job and I show that credential, they say, ‘OK, this is when you’re going to start.’”

The Lehigh Valley Model

Lehigh Valley middle schoolers prepare for high school, postsecondary, and lifetime career success.

Why is career education important? “It’s like driving your ship through a storm,” says Dylan Przelonski, a student at Southern Lehigh Middle School in Center Valley, Pennsylvania. “Career guidance is kind of like a lighthouse, and you can see basically where the danger is and where to start out and where to go. Because otherwise, you wouldn’t have any idea—you’d be sailing blindfolded.”

Przelonski—who, at the middle of his eighth-grade year, has undergone career interest assessments, researched promising careers in the local economy, spoken with professionals in different careers about their work, developed a career portfolio, prepared a resume, submitted a mock job application and cover letter, gone through mock job interviews, and written thank you letters after the whole process—is nowhere close to driving blindfolded when it comes to his future. He plans to pursue a career in mechanical engineering and has a very good idea why he’s doing it and what it will take to succeed.

■ A Central Role

An eighth grader can be off to such a strong start because in the Lehigh Valley, career preparation plays a central role in education from middle school through postsecondary instruction. Working with career portfolios that follow students from the eighth grade through high school and beyond, Lehigh County schools demonstrate that informed career management is a lifelong pursuit necessary for success.

Jane Greto, communications and information specialist at Lehigh Career and Technical Institute (LCTI), one of the best secondary and postsecondary career training schools in the country, says the institute reaches out early to Lehigh County students. Its annual Summer Fun Camp is “basically career exploration for fifth through eighth graders,” Greto says. “They get to explore four different career areas for five full days.”



■ Connecting Early

LCTI, which provides high school career preparation as well as college credits through dual enrollment at neighboring Lehigh Carbon Community College, connects early with middle school students to help them set long-term goals. “We go out to all eighth and ninth graders in Lehigh County on a yearly basis,” Greto says. “We promote all our programs and bring all eighth and ninth graders here for a tour of the facility.”

Eighth graders in Lehigh County enter high school having undergone a complete program of career exploration outlined in the county’s Middle School Career Pathways Planner, and culminating in selection of a career pathway that they will follow in high school. Students pick one of four career clusters—Arts and Humanities, Business and Communication Technology, Engineering and Industrial Technology, or Health and Human Services—and choose traditional academic or technical academic pathways required to reach their individual career goals.

■ Online Portfolios

Using the planner and an online tool called Career Cruising, students build a portfolio reflecting their career research, interests, abilities, activities, and planning.

Use of the planner and online tool is flexible, Greto says. “The middle school planner is used by all districts, but it’s left up to the school whether they’re going to use that document in fifth, sixth, seventh, or eighth grade and whether they’re going to spread instruction out or do it in one semester.”

Some districts use Career Cruising from middle school on, and others use different tools in middle school before switching to Career Cruising in high school. At Southern Lehigh Middle School, for example, when eighth graders pick a pathway and sign up for high school courses, they do so on an online system called Power School.

The system connects students, parents, and teachers in a single information network.

“It’s all tied together,” says eighth-grade teacher Heather Toto, who teaches the school’s career curriculum. “Teachers have Power Grade and Power Teacher, and it’s also tied to parents, who can access their children’s grades, their announcements, even what they ate for lunch.”

■ Lifetime Access

Online portfolios can follow students throughout their careers. Lehigh County students transferring to another county school or entering LCTI from middle school have continuing access to their Career Cruising portfolios. Counselors at LCTI or at a student’s previous high school can share information by adding messages to the student’s portfolio.

Career Cruising portfolios remain active even after a student graduates, allowing the owners

to upgrade their resumes and manage career information throughout their lives.

“We’re a small school,” says Mike Anderson, school counselor at Northern Lehigh Senior High. “We only have 700 students, but on our administrative site there are over 1,200 kids who have created electronic portfolios.”

Educators in Lehigh County believe this system is a perfect fit with the reality of lifetime career education. “Once you’re a user,” says Greto, “you’re always a user.”

Career Exploration in Action



Brittani Gilbert

How-To Know-How

Brittani Gilbert, an eighth grader at Lower Macungie Middle School in Lehigh County, says that while studying career exploration in the seventh grade, “I already had an idea of some of the things I wanted to do.” (Her first career choice is musician.) Much more helpful, she says, was the how-to information she picked up at her eighth-grade career fair. “I learned how to fill out a job application and how to do a cover letter. I thought that was interesting, because I did wonder how I would actually go about getting different jobs.”

On the Job

Eighth grader Keoni Johnson of Southern Lehigh Middle School went through his school’s Career Day last fall, talking with professionals in different careers and exercising his own career skills in mock job interviews. The experience is paying off already.

“I got a job last week,” he says proudly. “I used all that information and my interview skills from Career Day and actually got myself into the working world. I work in the dietary department at an assisted living center. I know everybody who’s there, because my mom works there, too, so it’s a good environment.”

Backup Plans

When we go out into the real world,” says Southern Lehigh eighth grader Justin Hofstetter, “we’ll have to be prepared, so we have to learn how to write resumes and support families with our jobs and all that.” Right now, Justin intends to follow his interest in math into a career in computer programming. “I started out with math and that led me into technology, and that was pretty much it,” he says.

His sister Heather, a senior at Southern Lehigh High School, was recently accepted at Wilmington University in Delaware, where she will major in criminal justice.

Justin says she is wisely covering all her career bases: “She’s going there, but she really wants to become a stunt double, so once she gets out she’s going to stunt school.”

Middle Schoolers Master STEM

Across Pennsylvania, middle school students are discovering career opportunities in science, technology, engineering, and math.

Pennsylvania's High Priority Occupations, identified by the Commonwealth as our best bets for job creation in the future (see page 6), include advanced materials & diversified manufacturing.

This is not our grandparents' manufacturing. This is high-tech, cutting-edge manufacturing requiring workers with advanced, transferable skills in what are called the STEM subjects—science, technology, engineering, and mathematics.

■ Getting the Word Out

Family-sustaining jobs in the field are available across the state. They generally require postsecondary education—but not graduate study and often not even a bachelor's degree. Because these jobs are important to our future prosperity, Pennsylvania is getting the word out to students at every level, including middle school.

For example, middle school students at 10 school districts, five in Lancaster County and five in Allegheny County, are taking part in a project funded by the National Science Foundation and aimed at



A Day at the Races

Scott Major, director of information technology at Lancaster County Career and Technology Center, is waiting in the center's CAD lab to watch his son Skyler, an eighth grader at Manor Middle School, race his car in the county's first annual F1 competition.

Major says the F1 program was a natural choice for his son. "Skyler's a hands-on learner. He's always been creative in building things, and when he saw the opportunity he jumped right on it. I think racing the cars was another thing that grabbed his attention.

"Right now he's heavy into math, and from what he told me, I think what he's gotten out of this is seeing how he's applying concepts from math and science, seeing them applied, actually seeing there's a reason for it.

"They use a CAD program to design the car, they put that on this machine, and it'll read the CAD file that they've created and cut the car out to their specifications. On a small scale, it's what they would do in a car factory."

Emily Peris and Alex Cauler, two of the Manor Middle eighth graders waiting to race, say meeting specifications in the design process was something of a bind. "The car has to be so long, so heavy, so tall, so far off the ground," says Cauler.

"Yeah," says Peris, "mostly my problem was it had to be longer." Peris, who says she comes by her interest in engineering naturally ("my dad's a heating and cooling guy; he's always been interested in that kind of stuff"), says she still might end up as a veterinarian.

Cauler can't let go of the design that got away. "I wanted to put wings on my car, but I don't think the specs would have allowed it."

recruiting students into careers in advanced manufacturing, and they're doing it by building race cars.

Terry Bupp-Petersheim is a technology education teacher at Elizabethtown Area Middle School, one of the schools participating in the project. In a busy classroom, he explains his students' work. "They have to draw a three-dimensional car on the computer and then the computer-controlled microrouter cuts the car for them out of balsa wood," he says. "They have specifications—the car has to be a certain size and weight. And then they race them."

■ Formula 1 Cars

Money from the National Science Foundation helped purchase the technology for the middle school classrooms, and in Lancaster County, countywide races are staged at the Lancaster County Career and Technology Center (LCCTC). The F1 (Formula 1) cars are propelled by blasts from CO² cartridges



down an enormous regulation-sized drag strip.

In sessions at the center a month before the race, high school students from the LCCTC mentor the middle school car designers.

"We had all the middle schoolers over for a trial race day," says Bryan Lefever, mechanical drafting and CAD instructor at LCCTC. "Our students

showed them how to measure their cars and check for specs and helped them make changes to their cars."

Beth Ann Haas, LCCTC curriculum director and a key administrator of the project, says, "We want these middle schoolers who have never come to the LCCTC to know us and to feel comfortable coming to us when they get in their high school years." "It's not about activities, it's about results. That's what I keep telling everybody. We create buzz around activities"—in this case, the F1 race—"to get kids involved with STEM and advanced manufacturing."

■ On to Nationals

John Sandrene, director of the Steel Center Area Vocational-Technical School in Jefferson Hills, works with the advanced manufacturing project at the western end of the state. Five districts in Allegheny County are involved in F1 competitions. In 2007, a team from South Park Middle School, together with a Lancaster County team from Conestoga Valley Middle School, advanced from Pennsylvania state competition all the way to nationals.

"South Park has really embraced this," Sandrene says. "Josh Cramer, the teacher there, didn't get the [microrouter] machine until January, and they ended up going to the national competition and did fairly well."

■ Fighting the Bias

Sandrene says the disappearance of traditional manufacturing jobs has left people in western Pennsylvania with a bias against manufacturing in general. To overcome that bias requires extra effort.

"We found that if you're going to encourage kids to go into advanced manufacturing, you have to start at the middle school level," he says. "People typically view 'manufacturing' as a negative word. What's ironic is that the major employers in Allegheny County are manufacturing companies, and yet those are the ones that people don't want their kids to get into."

Sandrene says the advanced manufacturing project also funds a summer camp at Steel Center for middle school students interested in technology. Middle schoolers in the area participate in a third program, called You and Your Money, as well. Students use plastic molding techniques to manufacture and collect red, white, and blue plastic coins. "The idea is to explain how products are made," Sandrene says. "You have raw material, you go through a process, which ends up in a product."

Haas says Lancaster County's Workforce Investment Board (WIB) shares the LCCTC's commitment to promoting STEM education. "The WIB has suggested that we continue to carry this concept into a bigger STEM initiative in Lancaster County," she says. "We're starting right now to look at how we can do more to promote STEM, including a STEM center where we can reach a broader audience than just the five districts in the advanced manufacturing project."

Sci-Tech Days

Hands-on science, technology, engineering, and math (STEM) career exploration was the rule of the day at Carnegie Science Center March 10, 2008, in Pittsburgh.

The Sci-Tech Days event attracted 109 western Pennsylvania middle school students from Clairton Middle School, West Mifflin Middle School, and Sterrette Academy. Local employers and community groups demonstrated how STEM skills are important in the working world, and how they contribute to career success.

Students met and interacted with scientists, engineers, and technical experts in a variety of fun activities organized to show STEM skills at work. They tested their abilities in a package sorting competition run by FedEx; learned about river ecology and transportation from representatives of RiverQuest, a Pittsburgh science and environmental education organization; and explored engineering careers with exhibitors from Michael Baker Industries. The Carnegie Science Center's Girls Math and Science Partnership showed students the wide variety of chemicals used in ordinary makeup.

The event was sponsored by the Allegheny Intermediate Unit (AIU) with funding from the federal Department of Transportation, says Daniel Paul, the AIU's Career Dynamics Program coordinator. "STEM is an important component of a number of growing industries in the Pittsburgh area, and the Sci-Tech Days event was designed to let students know about these opportunities.

"The intent is to capture the interest of younger teens," Paul says, "especially girls, as they start making choices that will affect their careers."

Paul says the AIU has introduced www.braincake.org to area middle school students with great success. "It's been especially attractive to girls. The website has a particular focus on math and science for girls in ways that are creative, useful, and fun."

Comments from surveys of students attending Sci-Tech Days indicate that the Carnegie Science Center is a big hit as well. "It was fun and interesting," "It shows you neat things," and "You have fun and learn at the same time," were typical student raves.

Programs of Study

Building blocks of the career and technical curriculum

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 requires the development and implementation of career and technical programs of study. Each local recipient receiving Perkins funds under the act is required to offer the relevant courses of at least one program of study. Programs of study build on such positive initiatives as Tech Prep, career pathways, career academies, and career clusters—initiatives that are already under way in career and technical education in Pennsylvania.

All programs of study are built around core academic subjects and usually integrate crosswalked academic and career electives, work experiences, and other learning opportunities. Ideally, a program of study will be challenging to a student, and include an upgraded academic core and a major.

Components of programs of study are already in place in some Pennsylvania school districts. The illustration at right, from Lancaster County's Elizabethtown Area School District Pathways Planner, shows how a career cluster might correlate with a program of study. Information, such as employment projections and required education level, is included to help inform students' decisions.

Statewide, programs of study are being developed by the Pennsylvania Board of Education according to a list of 31 classification of instructional program (CIP) codes (*at right*). To qualify for development, programs must

- Lead to one of Pennsylvania's High Priority Occupations
- Have a direct postsecondary connection
- Offer industry certifications
- Fit a certain program demographic (number of programs, number of students).

As in Elizabethtown, districts throughout Pennsylvania follow the structure of the programs of study; however, the choice of courses is up to each district.



CIP	TITLE
01.0201	Agricultural Mechanization, General
10.0399	Graphic Communication Other
11.0201	Computer Programming, General
11.0801	Web Page Design
11.0901	Computer Systems Networking and Telecommunications
15.0303	Electromechanical Technology/Electromechanical Engineering Technology
15.0399	Electrical/Electronic Engineering Technologies/Technicians, Other
15.1202	Computer Technology
15.1301	Drafting/Design Technology, General
19.0708	Child Care/Support Services Management
43.0107	Criminal Justice/Police
46.0201	Carpentry/Carpenter
46.0399	Electrical/Power Transmission Installers, Other
46.0401	Building/Property Maintenance/Manager
46.0502	Pipefitting/Steamfitting
47.0201	Heating, Air Conditioning, Refrigeration Mechanic
47.0603	Autobody Repair Technician
47.0604	Automotive Mechanics Technology/Technician
47.0605	Diesel Mechanics Technology/Technician
47.0699	Vehicle Maintenance & Repair Technologies, Other
48.0501	Machine Tool Technology/Machinist
48.0508	Welding Technology/Welder
48.0599	Precision Metal Workers, Other
50.0402	Commercial/Advertising Art
51.0601	Dental Assisting/Assistant
51.0899	Health/Medical Assisting Services, Other
52.0302	Accounting Technology/Technician & Bookkeeping
52.0401	Administrative Assistant & Secretarial Science, General
52.1201	Management Information Systems, General
52.1801	Sales/Distribution/Marketing General
52.1905	Travel Services Marketing



Key to Clusters

Career Pathway

Cluster name and description. The U.S. Department of Education has designated 16 clusters of careers.

Regional High Priority Occupations for the Lancaster County Workforce Investment Area are identified in **BOLD**.

Current career statistics are provided for each cluster.

EDUCATIONAL ATTAINMENT KEY

WK EXP	Work Experience
PS VOC	Postsecondary Vocational
LT OJT	Light On-the-job Training
M OJT	Moderate On-the-job Training
ST OJT	Short-term On-the-job Training
AD	Associate's Degree
BD	Bachelor's Degree
M	Master's Degree
PhD	Doctorate

Recommended Pathways electives

Pathways electives

Related Lancaster County Career and Technology Center Programs

BUSINESS AND FINANCE PATHWAY



Planning, managing, and performing marketing activities to reach organizational objectives

CAREER	Educational Attainment	Average PA Annual Wage	Projected Growth Percentage, New and Replacement
Insurance Sales Agents	BD	\$49,250	13.2
Securities Sales Representatives	BD	N/A	21.2
Travel Agents	PS VOC	\$34,760	6.7
Sales Representatives, Scientific and Technical	M OJT	\$65,580	20.0
Sales Representatives	M OJT	\$54,780	19.7
Real Estate Sales Agents	PS VOC	\$42,590	11.1
Telemarketers	ST OJT	\$29,870	-8.5
Insurance Sales Agents	BD	\$49,250	13.2
Securities Sales Representatives	BD	N/A	21.2
Marketing Managers	BD	\$98,720	0
First-Line Supervisors/Managers of Retail Workers	WK EXP	\$35,400	-1.0
Cashiers	ST OJT	\$15,800	-4.0
Counter and Rental Clerks	OJT	\$18,900	16.0
Retail Salesperson	OJT	\$19,300	8.0
Securities, Commodities, and Financial Service Sales Agents	BD	\$61,700	9.0
Demonstrators and Product Promoters	M OJT	\$21,000	10.0
Sales Engineers	BD	\$66,000	5.0
Parts Salesperson	M OJT	\$26,700	-10.0
Gaming Change Persons and Booth Cashiers	OJT	\$20,680	N/A
Advertising Sales Agents	M OJT	\$40,900	13.0

Recommended Electives I

Marketing Concepts	Intermediate Journalism
Introduction to Business	Advanced Journalism
Introduction to Publications	Advanced Speech
Speech I	Probability and Statistics
Business Publishing	World Languages
Consumer Economics	Cooperative Work Experience
Financial Investments	Travel and Lodging
Advanced Marketing	Computer Applications

How to Answer Parents' Questions

■ What's a career pathway?

Career pathways are routes to a career goal. In Pennsylvania the pathways are organized into 16 career clusters.

In the career pathways system, all students draw up a plan for education and career preparation. Based on their interests and aptitudes, they choose a pathway to a particular career goal and the core courses and electives that will enable them to graduate in that pathway. Schools throughout Pennsylvania have set up career pathways within the larger framework of the 16 national career clusters (see page 4). Because local conditions and workforce needs vary across the commonwealth, pathway names and designs vary. More varied still are the approaches to implementation. No two schools will be exactly alike in their presentation of the pathways. But across the board, the career pathways system incorporates as many varied ways as possible for students to experience careers—from personal skills assessments to job shadowing and field trips.

■ Why do I need to think about this now?

As a parent, you know that middle school is a time of self-discovery for your child. That makes grades six to eight an ideal window for career exploration—and a relatively inexpensive one, compared, for example, to the college years. Active participation in middle school career exploration activities will help your child understand:

- Personal interests and aptitudes
- Career possibilities
- Education opportunities.

Career pathways are designed with meaningful employment in mind, but their immediate objective is student achievement. Studies show that students in career pathways select more difficult courses and work harder in school. The system gives students hands-on, hard-to-deny evidence of the importance of learning to future success.

■ When does my child have to choose a career pathway?

Career pathways begin with awareness activities in elementary school, include exploration experiences in middle school, and provide opportunities for narrowing the focus in high school. Your child can choose a career pathway at any point along this continuum—or further ahead, in higher education or the workplace. He or she will be encouraged to select a pathway before picking high school courses. That pathway choice is by no means set in stone. High school students annually evaluate their pathways for secondary and postsecondary studies, and can switch with the help of a school counselor.

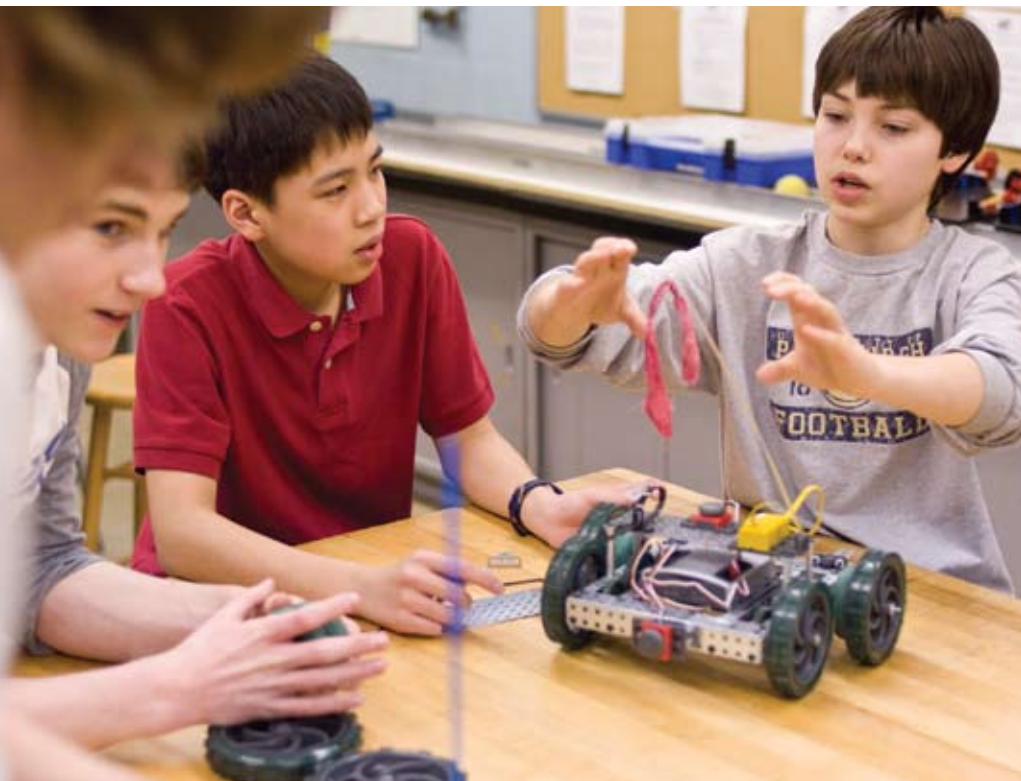
■ Who decides my child's career pathway?

Your child will determine his or her own career pathway. Just as in the rest of life's pathways, you, as a parent, have the greatest influence over that choice. Remember that the middle school years are a time when exploration takes precedence over decision making. Some ways to encourage the process:

- Talk to your child about your own work and the jobs of friends and relatives, so he or she will be familiar with several careers.
- Meet your child's school counselors and, through them, the teachers and resource people who assist with career pathways.
- Once your child has one or two pathways in mind, help him or her get information about high school courses he or she will need to take in order to enroll in postsecondary programs.
- Use your professional and community network to suggest or provide counselors, career and higher education information, speakers for a "career day," and trips to local employers' facilities.

■ Where can I go to find out more?

Your child's teacher or school counselor is the best source of more information about career pathways. He or she can direct you to an abundance of online information. (See Resources on the inside back cover of this booklet.)



Cocurricular Career Builders

For years, high school students have prepared for the world of work at career and technology centers around the commonwealth, in career-oriented classes, and through career and technical student organization (CTSO) classes.

As increasing numbers of Pennsylvania students in grades six through eight get involved in the career pathways system, student organizations that have career and technical education programs for middle schoolers are becoming an integral part of the commonwealth's CTE landscape. These programs boost students' technical skills and leadership abilities, with an emphasis during the middle school years on exploring aptitudes and different careers.

In Pennsylvania, the Department of Education and its Bureau of Career and Technical Education take a hands-on role in promoting extracurricular career and technical education. Besides directly supporting a number of CTSOs, the Bureau encourages involvement in service organizations such as Key Club and Junior Achievement (see box at right), through which students can gain important lessons in leadership, cooperation, and community responsibility—while having fun with like-minded friends and developing valuable social skills.

Here is a sampling of student organizations offering CTE programming to middle school students in Pennsylvania.



■ FBLA

Future Business Leaders of America—Middle Level

FBLA's Middle Level is its fastest-growing division, with more than 14,000 members at junior high and middle schools nationwide. Student members participate in a variety of activities, including job shadow programs, community service projects, and American enterprise projects. The national association partners with various state-level organizations to create and promote educational programs and curricula, and to provide members with unique opportunities. Competitive events are available for middle school members. Members earn recognition on all levels: local, state, and national. www.pafbla.org



■ FCCLA

Family, Career, and Community Leaders of America

FCCLA focuses on student growth and leadership through family and consumer sciences education. Middle school students are involved in programs and competitive events at national and state meetings. Members are recognized for proficiency and achievement in chapter and individual projects and for leadership skills. www.pafccla.org



■ TSA

Technology Student Association

The Technology Student Association fosters personal growth, leadership, and opportunities in technology, innovation, design, and engineering. Members apply and integrate science, technology, engineering, and mathematics concepts through cocurricular activities, competitive events, and related programs. www.patasa.org

JA in Central PA

In central Pennsylvania's Lancaster School District, Junior Achievement (JA) began as an after-school program at the high school level. That was 56 years ago. Now, says Allen Tate, regional JA president, "We're in most of the schools here. In the middle schools it's six sessions, with a very strong emphasis on success skills in preparation for jobs, and for career awareness." In JA, students learn from their own experience, but also from that of others in the working world. "The concept of JA is to have a volunteer teach the program," Tate says. "Teachers can teach the program, but if [instead] you have somebody that says, 'This is why you are learning what you are being taught, and this is how I use it in my business,' that makes an impact. This year we'll have over 790 programs throughout our area," concludes Tate, "and we will have volunteers for all of those." The organization hopes to bring its programs and volunteers to 20,000 central Pennsylvania students by 2009.



“We are a partnership with schools.”

—Allen Tate
President, Junior Achievement of Central Pennsylvania

“PIE in Your Face” Gets Students’ Attention

Partners in Education (PIE) in Hazleton reserves programs such as job shadowing for high school students, but it reaches out to middle school students with a dynamic menu of multimedia career-awareness activities. To learn about potential career paths, eighth graders in the Hazleton and Weatherly Area school districts, for example, take “virtual field trips” of regional businesses through a program called “PIE in Your Face.” On the PIE website, they tune in to streaming-video tours produced with the help of local high school students. In the classroom, they then complete a detailed “viewer’s guide” and other activities, such as filling out job applications, that are keyed to Pennsylvania’s academic standards for career education and work (see page 2). On Career Awareness Day, representatives from PIE member industries visit eighth-grade classrooms to answer students’ questions about training, salaries, work environment, and other aspects of jobs within that industry.

Advising Parents on Higher Education Costs

Plan now or wait until later: What's the best strategy for paying for higher education? Although a family's future may be full of questions, planning is not something that should wait until the last minute—and when it comes to financial planning in particular, the earlier the better. The Pennsylvania Higher Education Assistance Agency has these recommendations to assist parents of middle school students through the often intimidating process of planning to finance higher education.

■ Assume attendance

That's right; parents should assume their middle school student is going to college and base their actions and discussions on that assumption. Parents who assume that higher education is part of their child's future—even when uncertainties abound about how to pay the cost—are far more likely to make the dream come true.

■ Adjust for aid

Paying for higher education is a task that most parents fear, but it doesn't need to be that way. The key point to emphasize is that very few families pay the full "sticker price" for a college education. What families are expected to pay is the difference between the financial aid available and the total cost of attendance. Financial aid is meant to supplement a family's ability to pay, so that as a family's financial resources go down, the student's eligibility for financial aid goes up.

■ Start saving

Parents should be encouraged to start a savings or college investment program, no matter how small. Students, too, can contribute to a college fund (with cash gifts for birthdays and Christmas, for example). Unexpected income, such as gifts or bonuses, should go straight into the fund, since money that hasn't been budgeted for won't be missed. Anything saved or invested now will reduce college costs in the future. It's never too late—nor too early—to start saving.

■ Review roles and rules

As part of an ongoing family discussion about higher education and what it involves, parents and students should determine who will pay for what. Students need to understand how their actions can affect the cost of college—both

positively and negatively. Middle school is not too soon to link school achievement and behavior to college consequences.

■ Determine the debt

How much will parents have to borrow to pay for the education of all their children, not just the first one? Too often, parents consider the amount of money they will have to borrow to pay for the first year of college, and stop there. The result can be debt that prevents parents from being able to help any children after the first one. Families benefit from knowing the total costs and amounts to be borrowed for all years of college for all children.

■ Contain costs

Cost-reduction strategies abound. As middle school students begin to select career pathways, parents can consider these options:

■ Dual enrollment pre-college classes

At high schools where college courses are taught, college-bound students can save significant fees by taking every relevant course possible before graduation.

■ Community college

Costs per credit are much less at community colleges than standard college costs, and the credits can almost always be transferred to another college. Community colleges also offer a wide selection of two-year associate's degree programs that may qualify students for entry-level positions in their chosen career.

■ Commuting

Students who commute to college avoid costly room-and-board charges, yet can still take part in campus activities and organizations.

■ Dig deeper

Before students hit high school, while the pressure's still off, the middle school years make an ideal window for students and parents to explore college planning options and resources. Some recommendations:

■ Pennsylvania Higher Education Assistance Agency (PHEAA)

www.pheaa.org

Offers information on planning and paying for college, various financial aid programs and forms, commonsense tips, and a college planning timeline.

■ Education Planner

www.educationplanner.com

An award-winning career and college planning website with tools for learning about personality styles, career exploration, study skills, essay and resume writing, college selection and admission, financial aid, scholarship searches, tips for parents and students, cost calculators, and more.

■ American Education Services

www.aessuccess.org

This website presents student and parent loans, repayment information, and lists of participating lenders.

■ Student Loan Rebates

www.studentloanrebates.com

Allows users to earn free rebates as they shop—rebates they can use to pay college costs or repay student or parent loans.

■ Financial Literacy

www.jumpstart.org

Delivers the basics about money, saving, credit, loan repayment, and budgeting.

■ The PA College Savings 529 Plan

www.nowu529.com

A college investment and prepaid tuition plan made available through the Pennsylvania State Treasury.

■ You Can Deal with It

www.youcandealwithit.com

Financial planning, budgeting, money awareness, and student loan repayment.

■ Pennsylvania Association of Student Financial Aid Administrators

www.pasfaa.org

The official website of the professional financial aid officers at Pennsylvania postsecondary institutions.

Resources

Visit these websites for useful information on career pathways and workforce development in Pennsylvania.

Career and Technical Education

www.pde.state.pa.us/bcte

The Bureau of Career and Technical Education website offers a wealth of opportunities for Pennsylvanians to become involved—as teachers, business partners, parents, or friends—with career and technical education in their local areas. It's also a great place to learn about what's new statewide in accreditation, assessment, grants and funding, partnerships, and programs available at the middle school level.

Career Clusters

www.careerclusters.org

This online guide to the 16 national career clusters (see page 4) offers free, downloadable sample plans of study for each of the clusters, cluster information, success stories, information on upcoming cluster conferences, and more.

Career Path

www.careerpath.com

An indispensable resource for anyone who is looking for employment in or near any major U.S. city.

Career Voyages

www.careervoyages.gov

This site provides information on high-growth, high-demand occupations along with the skills and education needed to attain those jobs.

Entrepreneurship Education

www.entre-ed.org

This web page is for teachers and others who help students of all ages find their own entrepreneurial opportunities.

A Guide to Pennsylvania Postsecondary Career Schools

www.papsa.org

This site gives access to career education information by county/region, career area, or specific school.

O*NET Online

<http://online.onetcenter.org>

The O*NET system serves as the nation's primary source of occupational information, providing comprehensive information on key attributes and characteristics of workers and occupations.

PA STEM

www.pasteminitiative.org

A unique public-private partnership around education redesign. Led by the Pennsylvania Department of Education, it was formed in August 2007 and consisted initially of Commonwealth agencies, Team PA Foundation, and the National Governor's Association.

Pennsylvania Career Standards

www.pacareerstandards.com

The Pennsylvania Career Education & Work (CEW) Standards Toolkit provides resources, references, crosswalks, and other tools to assist educators in implementing the Pennsylvania CEW standards.

Pennsylvania Career Zone

www.pacareerzone.org

A website designed to convey a wide variety of career and labor market information for teaching and exploring, targeted to students at the elementary, middle, and high school levels.

Pennsylvania Workforce Development

www.paworkforce.state.pa.us

The commonwealth has organized a partnership of state agencies, including the Departments of Education, Public Welfare, Labor and Industry, Aging, and Community and Economic Development, to promote workforce development. The website features workforce statistics, career information for students, and resources for teachers and counselors.

Middle School STEM Equity Resources

Listed below are websites designed to involve middle school girls in science, technology, engineering, and math (STEM) studies and, ultimately, careers.

Click! Urban Adventure

www.clickgame.org

Click! Urban Adventure is a mixed-reality live action role-playing (MR LARP) game, and also a research project, designed to engage 11- to 14-year-old girls in a team-based game leading to learning about technology and science.

BrainCake

www.braincake.org

The BrainCake website is part of the Girls, Math & Science Partnership effort to engage, educate, and include girls ages 11–17 in math and science, and to enlist the support of their parents, teachers, and mentors.

EngineerGirl

www.engineergirl.org

The EngineerGirl website, designed specifically for middle school girls, is part of a National Academies of Engineering project to bring national attention to the opportunity that engineering represents to all people at any age, but particularly to women and girls.

GirlGeeks

www.girlgeeks.org

GirlGeeks, the source for women in computing, offers abundant easy-to-read resources on technology careers, education, and business in a lively magazine-style format.



Commonwealth of Pennsylvania

Edward G. Rendell, Governor

Department of Education

Gerald L. Zahorchak, Secretary

Office of Elementary and Secondary Education

Diane Castelbuono, Deputy Secretary

Bureau of Career and Technical Education

Lee Burket, Director

Division of Professional Development and Support Services

Katherine C. Simchock, Division Manager

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Electronic copies of this booklet, and of the 2006 *Pennsylvania Pathways: An Educators' Guide to Career Pathways*, are available at www.pde.state.pa.us. If you have any questions about these publications, contact:

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The following persons have been designated to handle inquiries regarding the nondiscrimination policies:

For inquiries concerning

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333 Market Street, 11th Floor
Harrisburg, PA 17126-0333
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nondiscrimination in all other

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programs and activities:**

Pennsylvania Department of Education
School Services Unit Director
333 Market Street, 5th Floor
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